ÄKTA™ start

Product Documentation

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1 Introduction

Purpose of this document

This document gives an overview of ÄKTA start, general specifications, and EC Declaration of Conformity. In addition, important user information and safety instructions are included.

For more information about ÄKTA start and operating instructions, refer to the user documentation listed in *Section 1.2 Associated documentation, on page 7*.

1.1 Important user information

Read before operating the product

All users must read the entire *Operating Instructions* before installing, operating or maintaining the product.

Always keep the *Operating Instructions* at hand when operating the product.

Do not operate the product in any other way than described in the user documentation. If you do, you may be exposed to hazards that can lead to personal injury and you may cause damage to the equipment.

Intended use

ÄKTA start is a liquid chromatography system used for preparative purification of proteins at laboratory-scale. The system can be used for a variety of research purposes to fulfill the needs of the users in the academia and in the life sciences industry.

ÄKTA start is intended for research use only, and shall not be used in any clinical procedures, or for diagnostic purposes.

Prerequisites

In order to follow this manual and use the system in the manner it is intended, it is important that:

- you understand the concepts of liquid chromatography
- you have read and understood the *Safety instructions* chapter in the *ÄKTA start Product Documentation*.

Safety notices

This user documentation contains safety notices (WARNING, CAUTION, and NOTICE) concerning the safe use of the product. See definitions below.

WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. It is important not to proceed until all stated conditions are met and clearly understood.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. It is important not to proceed until all stated conditions are met and clearly understood.

NOTICE

NOTICE indicates instructions that must be followed to avoid damage to the product or other equipment.

Notes and tips

Note: *A note is used to indicate information that is important for trouble-free and optimal use of the product.*

Tip: *A tip contains useful information that can improve or optimize your procedures.*

1.2 Associated documentation

Introduction

This section describes the user documentation that is delivered with the instrument and how to find related literature that can be downloaded or ordered from GE Healthcare Life Sciences.

User documentation on the CD

The user documentation listed in the table below is available on the ÄKTA start User Documentation CD. A display help is available from the Instrument Display.

Documentation	Main contents
ÄKTA start Operating Instructions	Instructions needed to install, operate and maintain ÄKTA start in a safe way.
ÄKTA start Instrument Display Help	Dialog descriptions of the functionality menu for ÄKTA start (only accessible from the Instrument Display).
ÄKTA start Maintenance Manual	Detailed instrument and module descriptions, including instructions needed to maintain and troubleshoot ÄKTA start.
ÄKTA start System Cue Card	A condensed guide to prepare and run chromatographic techniques on ÄKTA start.
ÄKTA start Maintenance Cue Card	A condensed guide to handling routine maintenance operations and troubleshooting ÄKTA start.

From the Help menu in UNICORN start or on the UNICORN start DVD, the following user documentation is available.

Documentation	Main contents
UNICORN start 1.0 User Manual	Overview and detailed descriptions of the system control software designed for ÄKTA start, which includes process picture map for real time monitoring, method editor, evaluation and administration modules.
UNICORN start Online Help	Dialog descriptions for UNICORN start (only accessible from the Help menu).

Data files, application notes and user documentation on the web

To order or download data files, application notes or user documentation, see the instruction below.

Step	Action
1	Go to www.gelifesciences.com/AKTA.
2	Click ***ÄKTA Lab-Scale Systems***.
3	Select ***ÄKTA start*** from the list.
4	Click ***Related Documents***.
5	Select to download the chosen literature.

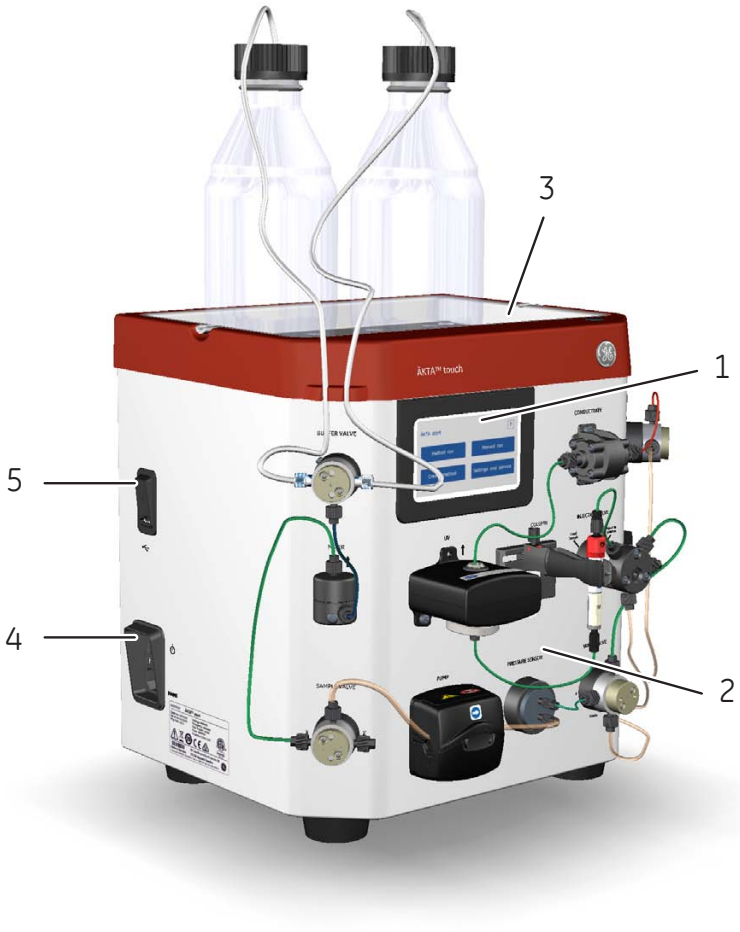
Access documentation from mobile units

Scan the code using your mobile phone or tablet computer to access the product page for ÄKTA start. Select documents to download under the ***Related Documents*** tab.

1.3 Instrument view

Illustration of the instrument

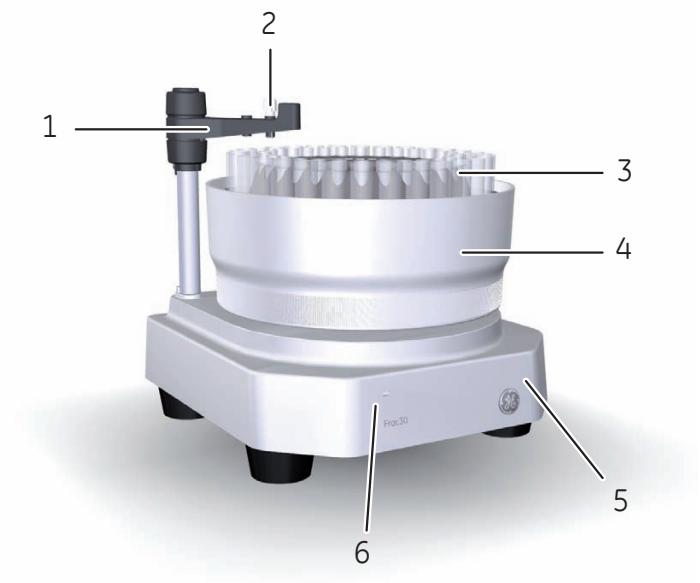
The illustration below shows the main parts of the instrument.



Part	Description	Function
1	Instrument Display	User interface for controlling the system and visualization of the runtime data.
2	Wet side	The modules interconnected by tubing have the following functions: • to deliver the liquid in a specified flow path and divert the flow as required, • to monitor the UV absorbance and conductivity of the liquid.
3	Buffer tray	Location intended for the placement of buffer bottles used during chromatography runs.
4	Power switch	Connects or disconnects the power.
5	USB port	To connect a USB memory stick for storage of results and transfer of files.

Illustration of the Fraction collector

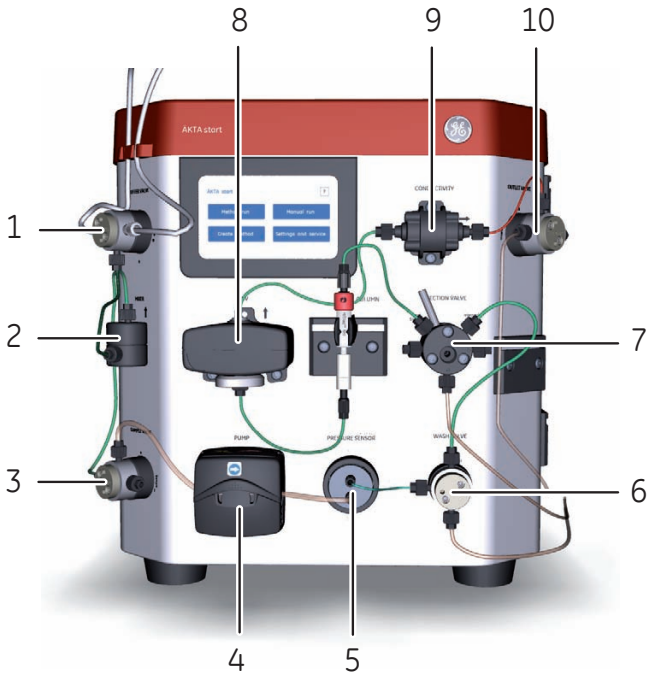
The illustration below shows the Fraction collector, Frac30.



Part	Description	Function
1	Dispenser arm assembly	Holds and positions the tubing holder for dispensing the liquid into fractions.
2	Tubing holder	Holds the tubing used for dispensing the liquid fractions into the collection tubes.
3	Collection tubes	10 to 18 mm diameter tubes used to collect the fractions.
4	Bowl assembly	Holder for collection tubes, which supports tubes of four sizes.
5	Base unit	Case for electromechanical assembly and holder for the Bowl assembly.
6	LED	Power on indicator.

Illustration of the instrument modules

The illustration below shows the locations and gives brief descriptions of the modules placed on the wet side of the instrument.



Part	Function	Description
1	**Buffer valve**	A 3-port valve that is used as a switching valve for gradient formation. It enables the use of two buffers, which are required for forming a gradient during runs.
2	**Mixer**	A static mixer that is used for mixing of buffers A and B.
3	**Sample valve**	A 3-port valve that allows either the buffer or the sample to enter the flow path. The **Sample valve** enables direct application of the sample onto the column using the **Pump**.

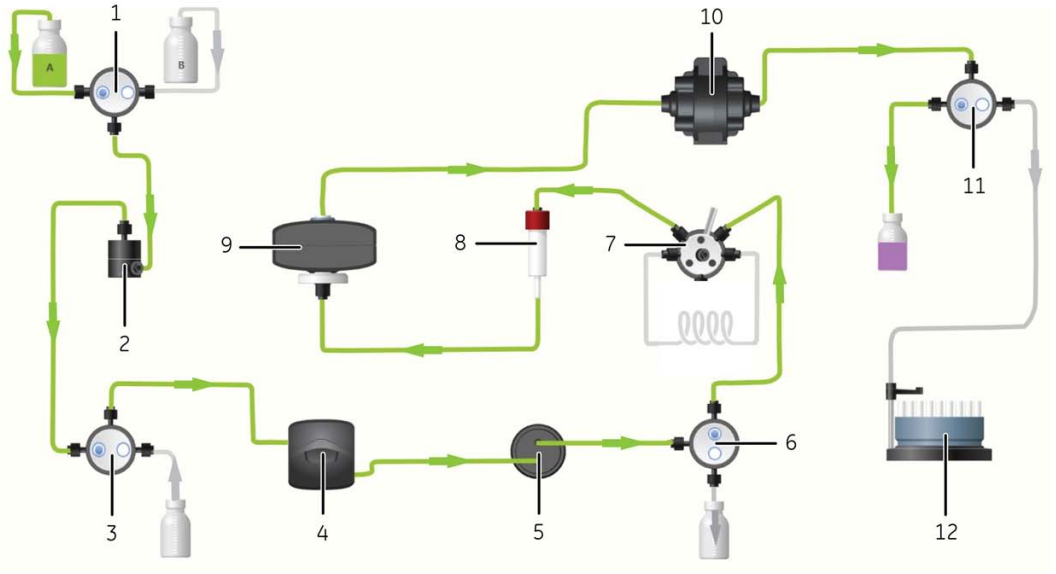
Part	Function	Description
4	**Pump**	A peristaltic pump, which delivers buffer or sample to the flow path with a flow rate of up to 5 ml/min. For cleaning procedures, the **Pump** can flush the flow path at a flow rate of 10 ml/min.
5	**Pressure sensor**	The **Pressure sensor** reads the pressure in the flow path and senses overpressure.
6	**Wash valve**	A 3-port valve that is used to divert the flow path to waste. The **Wash valve** switches automatically during the predefined cleaning procedure, ***Pump wash***. In a manual run, the valve can be set to the intended position by configuring the run parameters.
7	**Injection valve**	A 6-port manually operated valve that is used to transfer the sample loaded in the sample loop on to the column. A sample loop is connected to the appropriate ports of the valve. The valve is switched manually to positions: • ***Load sample*** (default): to allow the loading of the sample into the sample loop. • ***Inject to column***: to transfer the sample from the loop on to the column during a chromatography run.
8	**UV**	The **UV** Monitor continuously measures the absorbance of the liquid in the **UV flow cell** at a set wavelength of 280 nm. The **UV flow cell** has a path length of 2 mm.

Part	Function	Description
9	**Conductivity**	The **Conductivity** Monitor continuously reads the conductivity of the liquid in the **Conductivity flow cell**. The conductivity is automatically calculated by multiplying the measured conductance by the cell constant of the flow cell. The cell constant is factory-calibrated. The **Conductivity flow cell** is provided with a temperature sensor that measures the temperature of the liquid in the **Conductivity flow cell**. ***Note:*** *The buffers used should be within the conductivity range of the instrument (0 to 300 mS/cm).*
10	**Outlet valve**	A 3-port valve that is used to direct the flow to the Fraction collector, or to Waste.

1.4 Process and instrumentation design

Illustration of the flow path

The illustration below shows the flow path for ÄKTA start. The flow path contains **Pump**, **Mixer**, **Valves**, and **UV**, **Conductivity** and **Pressure** monitors. The individual instrument modules are presented in the table below. For a detailed description of the modules, see the *ÄKTA start Product Documentation*.



Part	Description	Part	Description
1	**Buffer valve**	7	**Injection valve** (manual)
2	**Mixer**	8	Column
3	**Sample valve**	9	**UV** Monitor
4	**Pump**	10	**Conductivity** Monitor
5	**Pressure sensor**	11	**Outlet valve**
6	**Wash valve**	12	Fraction collector

2 General specifications

2.1 System specifications

Parameter	Data
System configuration	Benchtop system
Control system	Instrument Display and/or UNICORN™ start
Connection between PC and instrument	USB
Dimensions (W × D × H)	340 mm × 280 mm × 360 mm
Weight (excluding packaging)	8 kg
Power supply	100 to 240 VAC, 50/60 Hz
Power consumption	95 VA
Fuse	Fast blow glass tube type, F5AL250V
Enclosure protective class	IP21
Tubing and connectors:	
Inlet	PTFE tubing, length 100 cm, i.d. 1.6 mm, 5/16-24 UNF connections
Buffer valve to **Mixer**	PEEK tubing, Length 15 cm, i.d. 0.75 mm, 10-32 UNF connections
Mixer to **Sample valve**	PEEK tubing, Length 23 cm, i.d. 0.75 mm, 10-32 UNF connections
Sample valve to **Pressure sensor** (via **Pump**)	Marprene tubing, Length 25 cm, i.d. 0.8 mm, 10-32 UNF connections
Pressure sensor to **Wash valve**	PEEK tubing, Length 13 cm, i.d. 0.75 mm, 10-32 UNF connections
Wash valve to **Injection valve**	PEEK tubing, Length 17 cm, i.d. 0.75 mm, 10-32 UNF connections
Injection valve to Column	PEEK tubing, Length 15 cm, i.d. 0.75 mm, 10-32 UNF connections

Parameter	Data
Column to **UV**	PEEK tubing, Length 15 cm, i.d. 0.75 mm, 10-32 UNF connections
UV to **Conductivity**	PEEK tubing, Length 20 cm, i.d. 0.75 mm, 10-32 UNF connections
Conductivity to **Outlet valve**	PEEK tubing, Length 19 cm, i.d. 0.50 mm, 10-32 UNF connections
Outlet valve to Frac30	PEEK tubing, Length 50 cm , i.d. 0.75 mm, 10-32 UNF connections
Waste tubing	ETFE tubing, Length 60 cm i.d. 1.0 mm, Fingertight connector, 1/16"
Sample tubing	ETFE tubing, Length 25 cm, i.d. 1.0 mm, Fingertight connector, 1/16"

2.2 Environmental ranges

Parameter	Data
Storage and transport temperature range	-25°C to +60°C
Chemical environment (Relative humidity)	20% to 80%, non-condensing

2.3 Operating range

Parameter	Data
Operating temperature range	+4°C to +35°C
Relative humidity	20% to 80%, non-condensing

2.4 Technical specifications

2.4.1 Pump

Parameter	Data
Pump type	Peristaltic pump. Single channel, four roller pump head with low pulsation

Parameter	Data
Flow rate	0.5 to 5 ml/min (operating range) 10 ml/min (Wash flow)
Flow rate specifications	• Accuracy: - Flow rate ≤ 1 ml/min: ±15% - Flow rate > 1 ml/min: ±10% • Precision: - Flow rate ≤ 1 ml/min: ±15% - Flow rate > 1 ml/min: ±10% Condition: 0.8 to 2 cP and fresh pump tubing.
Pressure range	0 to 0.5 MPa (5 Bar)
Viscosity range	0.6 to 5 cP

2.4.2 Mixer

Parameter	Data
Mixing principle	Static mixer
Mixer volume	0.4 ml

2.4.3 Valves: Buffer, Sample, Wash and Outlet

Parameter	Data
Type	Solenoid type switch valve
No. of ports	3 ports: • **Buffer valve** and **Sample valve**: 2 in – 1 out • **Wash valve** and **Outlet valve**: 1 in – 2 out

2.4.4 Injection valve

Parameter	Data
Type	Rotary type manual valve
Function	Sample injection through **Loop**.

Parameter	Data
No. of ports	6 ports

2.4.5 Gradient formation

Parameter	Data
Gradient flow rate range	0.5 to 5 ml/min
Gradient composition accuracy	± 5% Conditions: 5% to 95% B, 1 to 5 ml/min, 0.8 to 2 cP and fresh pump tubing.

2.4.6 Pressure sensor

Parameter	Data
Placement of sensor	**Pressure sensor** is located after the **Pump**.
Range	0 to 0.5 MPa (5 Bar)
Accuracy	± 0.05 MPa

2.4.7 UV

Parameter	Data
Wavelength range	280 nm ± 3 nm. Single wavelength
Absorbance range	-0.1 to +2 AU
Linearity	Within ± 5% up to 1.5 AU
Operating pressure	0 to 0.5 MPa
Flow cell	2 mm optical path length. Total cell volume is 30 µl.

2.4.8 Conductivity

Parameter	Data
Conductivity range	0 mS/cm to 300 mS/cm
Resolution	1 mS/cm
Accuracy	± 5% or ± 2 mS/cm (whichever is greater)

Parameter	Data
Operating pressure	0 to 0.5 MPa
Flow cell volume	22 µl
Temperature monitor range	4°C to 35°C
Temperature monitor accuracy	± 10% or ± 5°C (whichever is greater)

2.4.9 Frac30

Parameter	Data
Number of fractions	Up to 30
Vessel type	• Centrifuge tubes (10 to 12 ml) • Falcon™ tubes (15 ml) • Eppendorf™ tubes (1.5 ml or 2 ml) • 5 ml tubes (12 × 75 mm)
Fraction volumes	0.5 to 15 ml
Flammable liquids	No
Delay volume (**UV** to Dispenser head)	0.49 ml (default)
Dimensions (W × D × H)	270 × 280 × 285 mm
Weight	5 Kg

3 Safety instructions

About this chapter

This chapter describes safety precautions and emergency shutdown procedures for the product. The labels on the system and recycling procedures are also described.

In this chapter

This chapter contains the following sections:

Section	See page
3.1 Safety precautions	22
3.2 Labels	29
3.3 Emergency procedures	32
3.4 Recycling procedures	34
3.5 Declaration of Hazardous Substances (DoHS)	35

3.1 Safety precautions

Introduction

ÄKTA start is powered by mains voltage and handles liquids that may be hazardous. Before installing, operating or maintaining the system, you must be aware of the hazards described in this manual. ***Follow the instructions provided to avoid personal injuries or damage to the equipment***.

The safety precautions in this section are grouped into the following categories:

- General precautions
- Using flammable liquids
- Personal protection
- Installing and moving the instrument

- System operation
- Maintenance

General precautions

WARNING

Always follow these General precautions to avoid injury when using ÄKTA start.

- Do not operate ÄKTA start in any other way than described in the ÄKTA start user documentation.
- Operation and user maintenance of ÄKTA start should be performed according to the instructions described in *ÄKTA start Operating Instructions* and *ÄKTA start Maintenance Manual*.
- Do not use any accessories not supplied or recommended by GE Healthcare Life Sciences.
- Do not use ÄKTA start if it is not working properly, or if it has suffered any damage, for example:
  - damage to the power cord, its plug or the Frac30 cable
  - damage caused by dropping the equipment
  - damage caused by splashing liquid onto it

Using flammable liquids

WARNING

When using flammable liquids with ÄKTA start, follow these precautions to avoid any risk of fire or explosion.

- **Fire Hazard**. Before starting the system, make sure that there is no unintentional leakage in the instrument or tubing.
- **Explosion hazard**. To avoid building up an explosive atmosphere when using flammable liquids, make sure that the room ventilation meets the local requirements.

CAUTION

To avoid hazardous situations when unpacking, installing or moving ÄKTA start, follow the precautions below.

ÄKTA start is filled with denaturated alcohol (50% C2H5OH (ethanol)) at delivery. **The denatured alcohol mixture can be hazardous to humans if consumed.** Flush out the denaturated alcohol before assembling, testing or integrating ÄKTA start into the intended process context.

Personal protection

WARNING

To avoid hazardous situations when working with ÄKTA start, take the following measures for personal protection.

Spread of biological agents. The operator has to take all necessary actions to avoid spreading hazardous biological agents in the vicinity of the equipment. The facility should comply with the national code of practice for biosafety.

CAUTION

To avoid hazardous situations when working with ÄKTA start, take the following measures for personal protection.

- Always use appropriate personal protective equipment during operation and maintenance of ÄKTA start.
- **Spillage hazard**. When using ÄKTA start use personal protective equipment like goggles, lab coat, protective shoes and gloves to avoid any circumstances of spillage.
- **Cut injuries**. The tubing cutter is very sharp and must be handled with care to avoid injuries.
- **Hazardous substances.** When using hazardous chemical and biological agents, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the substances used. Follow local and/or national regulations for safe operation, maintenance and decommissioning of the equipment.

Installing and moving the instrument

WARNING

To avoid damage to person when installing or moving ÄKTA start, follow the instructions below.

- **Moving the instrument horizontally**. One person is recommended when moving the instrument horizontally.
- **Supply voltage**. Make sure that the supply voltage at the wall outlet corresponds to the marking on the instrument, before connecting the power cord.
- **Power cord**. Only use grounded power cords delivered or approved by GE Healthcare Life Sciences.
- **Access to power switch and power cord with plug.** Do not block access to the power switch and power cord. The power switch must always be easy to access. The power cord with plug must always be easy to disconnect.
- **Installing the computer (optional)**. The computer should be installed and used according to the instructions provided by the manufacturer of the computer.
- **Disconnect power**. Always switch off power to ÄKTA start before an instrument module is removed or installed, or a cable is connected or disconnected.

CAUTION

To avoid damage to person when installing or moving ÄKTA start, follow the instructions below.

Protective ground. ÄKTA start must always be connected to a grounded power outlet.

NOTICE

To avoid damage to ÄKTA start or other equipment when installing or moving the instrument, follow the instructions below.

- **Vents on ÄKTA start**. To ensure adequate ventilation, keep papers and other objects away from the vents of the instrument.
- Any computer used with the equipment shall comply with IEC 60950 and be installed and used according to the manufacturer's instructions.
- Frac30 should not be connected or disconnected from ÄKTA start when the instrument is powered ON.

System operation

WARNING

To avoid personal injury when operating ÄKTA start, follow the instructions below.

- **Rotating the instrument**. Make sure that there is always at least 20 cm of free space around ÄKTA start to allow for sufficient ventilation. When turning or moving the instrument, take care not to stretch or squeeze tubing or cables. A disconnected cable may cause power interruption or network interruption. Stretched tubing may cause bottles to fall, resulting in liquid spillage and shattered glass. Squeezed tubing may cause increase in pressure, or block liquid flow. To avoid the risk of knocking over bottles, always place bottles on the buffer tray and turn or move carefully.
- **Hazardous chemicals during run**. When using hazardous chemicals, run the ***System cleaning*** template to clean and flush the entire system tubing with distilled water, before service and maintenance.
- **Setting**. Check that the correct outlet size settings are used. Make sure that tubing and fittings are properly connected and secured. Make sure that the pressure limit settings are correct before starting the run.

CAUTION

To avoid personal injury when operating ÄKTA start, follow the instructions below.

- **Max weight on Buffer tray**. Do not place containers with a volume of more than 1 liter each on the Buffer tray. The maximum allowed weight on the Buffer tray is 5 kg.
- **Large spillage**. Switch off ÄKTA start and unplug the power cord, if large spillage occurs.

NOTICE

To avoid damage to ÄKTA start or other equipment when operating the instrument, follow the instructions below.

- **Keep UV flow cell clean.** Do not allow solutions containing dissolved salts, proteins or other solid solutes to dry out in the flow cell. Do not allow particles to enter the flow cell, as damage to the flow cell may occur.
- **Pre-fill UV flow cell**. Make sure that the **UV flow cell** is pre-filled with liquid before starting the system.
- **Avoid condensation.** If ÄKTA start is kept in a cold room, cold cabinet or similar, keep the instrument switched on in order to avoid condensation.
- **Avoid overheating.** If ÄKTA start is kept in a cold cabinet and the cold cabinet is switched off, make sure to switch off the instrument and keep the cold cabinet open to avoid overheating.
- **Place the computer in room temperature.** If ÄKTA start is placed in a cold room, place the computer outside the cold room and use the PC Connectivity cable delivered with the instrument to connect to the computer.
- **Keep the pump cover open when not using the system**. Open the peristaltic pump cover after you switch off the equipment. This will enhance the life time of the pump tubing.

Maintenance

WARNING

To avoid damage to person when performing maintenance on ÄKTA start, follow the instructions below.

- **Electrical shock hazard**. Do not open any covers or parts unless specified in the user documentation. Except for the maintenance and service described in the user documentation, all other repairs should be done by service personnel authorized by GE Healthcare Life Sciences.
- Only spare parts and accessories that are approved or supplied by GE Healthcare Life Sciences may be used for maintaining or servicing ÄKTA start.
- **Disconnect power**. Always switch off power to the instrument before replacing any component on the instrument or cleaning the instrument, unless stated otherwise in the user documentation.
- **Spillage Hazard**. Avoid spillage of fluids on the surfaces of the instrument which have cables, plugs and other wirings. Be careful if there is spillage of fluids on the tray while trying to remove the tray from ÄKTA start.
- NaOH is corrosive and therefore dangerous to health. When using hazardous chemicals, avoid spillage and wear protective glasses and other suitable Personal Protective Equipment (PPE).

CAUTION

To avoid damage to person when performing maintenance on ÄKTA start, follow the instructions below.

- **Hazardous UV light**. Always switch off power to the instrument before replacing the **UV flow cell**.
- If hazardous chemicals are used for system or column cleaning, wash the system or columns with a neutral solution in the last phase or step before maintenance.

NOTICE

Cleaning. Keep the instrument dry and clean. Wipe regularly with a soft damp tissue and, if necessary, a mild cleaning agent. Let the instrument dry completely before use.

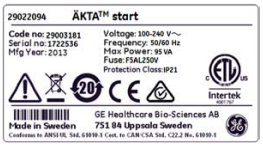
3.2 Labels

Introduction

This section describes the safety labels and labels concerning hazardous substances that are attached to ÄKTA start. The instrument serial number is also visible from the instrument product label which is illustrated here.

Labels on ÄKTA start

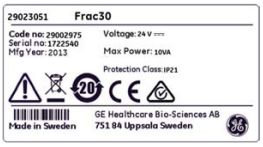
The illustrations below show the labels that are attached to ÄKTA start.

Label	Description	Placement
	Instrument label including safety symbols and specification.	
	Do not open any covers on the instrument. This will void the warranty.	

Label	Description	Placement
	Keep the pump cover open when not using the system. Open the pump cover after you switch off the instrument.	
	This product does not comply with the ATEX directive and must not be used in explosive atmospheres.	
	Pinch hazard. Switch off the Pump before tubing loading.	

Label on Frac30

The illustration below shows the labels that are attached to Frac30.

Label	Description	Placement
	Instrument label including safety symbols and specification.	
	Do not open any covers on the instrument. This will void the warranty.	

Safety symbols

The following safety symbols are used in the labels:

Label	Meaning
	Warning! Do not use ÄKTA start before reading the *ÄKTA start Operating Instructions*. Do not open any covers or replace parts unless specifically stated in the user documentation.
	The system complies with the requirements for electromagnetic compliance (EMC) in Australia and New Zealand.
	The system complies with applicable European directives.
	This symbol indicates that ÄKTA start has been certified by a Nationally Recognized Testing Laboratory (NRTL). NRTL means an organization that is recognized by the US Occupational Safety and Health Administration (OSHA) as meeting the legal requirements of Title 29 of the Code of Federal Regulations (29 CFR), Part 1910.7.

Labels concerning hazardous substances

The following symbols on the labels concern hazardous substances:

Label	Meaning
	This symbol indicates that electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.

Label	Meaning
	This symbol indicates that the product contains hazardous materials in excess of the limits established by the Chinese standard *SJ/T11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products*.

3.3 Emergency procedures

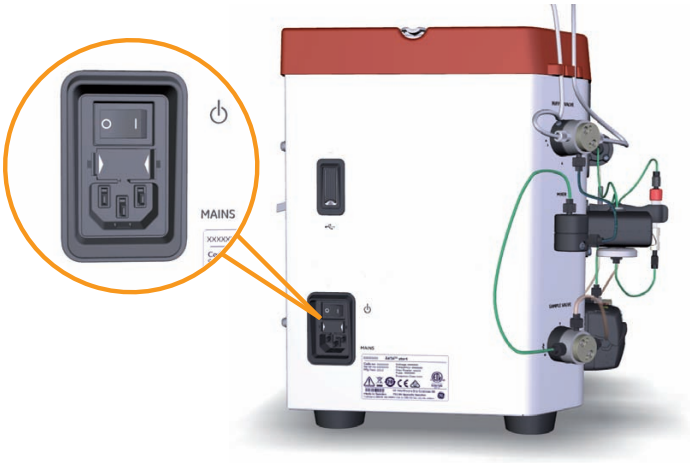
Introduction

This section describes how to do an emergency shutdown of ÄKTA start. The section also describes the result in the event of power failure.

Emergency shutdown

In an emergency situation:

Switch off power to the instrument by pressing the power switch to the **O** position or by disconnecting the power cord from the instrument. The run is interrupted immediately.



WARNING

Access to power switch and power cord with plug. Do not block access to the power switch and power cord. The power switch must always be easy to access. The power cord with plug must always be easy to disconnect.

Power failure

The result of a power failure depends on which unit is affected.

Power failure to...	will result in...
ÄKTA start	• The run is interrupted immediately. • The data collected up to the time of the power failure is available on the USB memory stick *or*, if the system is connected to a computer, UNICORN start.
UNICORN start on a computer	• The computer with UNICORN start installed shuts down. • On the ÄKTA start Instrument Display, all four touch buttons will be highlighted. • The run is interrupted immediately. • Data generated up to 10 seconds before the power failure can be recovered. ***Note:*** *The UNICORN start client may close down during a temporary overload of the processor. This may appear as a computer failure. The run continues and you can restart the UNICORN start client to regain control.*

3.4 Recycling procedures

Introduction

This section describes the procedures for disposal and recycling of ÄKTA start.

Decommissioning of the equipment

ÄKTA start must be decontaminated before decommissioning. Follow local regulations for scrapping of the equipment.

Disposal, general instructions

When taking ÄKTA start out of service, the different materials must be separated and recycled according to national and local environmental regulations.

Recycling of hazardous substances

ÄKTA start contains hazardous substances. Detailed information is available from your GE Healthcare Life Sciences representative.

Disposal of electrical components

Waste comprising electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.

3.5 Declaration of Hazardous Substances (DoHS)

Introduction

The following product pollution control information is provided according to SJ/T11364-2006 Marking for Control of Pollution caused by Electronic Information Products.

根据SJ/T11364-2006《电子信息产品污染控制标识要求》特提供如下有关污染 控制方面的信息

Symbols used in pollution control label

电子信息产品污染控制标志说明

Label	Meaning
	This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard SJ/T11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the toxic or hazardous substances or elements contained in electronic information products will not leak or mutate under normal operating conditions so that the use of such electronic information products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year". In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly. Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures. This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

Label	Meaning
	该标志表明本产品含有超过SJ/T11363-2006《电子信息产品中有毒有害物质的限量要求》中限量的有毒有害物质。标志中的数字为本产品的环保使用期，表明本产品在正常使用的条件下，有毒有害物质不会发生外泄或突变，用户使用本产品不会对环境造成严重污染或对其人身、财产造成严重损害的期限。单位为年。 为保证所申明的环保使用期限，应按产品手册中所规定的环境条件和方法进行正常使用，并严格遵守产品维修手册中规定的期维修和保养要求。 产品中的消耗件和某些零部件可能有其单独的环保使用期限标志，并且其环保使用期限有可能比整个产品本身的环保使用期限短。应到期按产品维修程序更换那些消耗件和零部件，以保证所申明的整个产品的环保使用期限。 本产品在使用寿命结束时不可作为普通生活垃圾处理，应被单独收集妥善处理

List of hazardous substances and their concentrations

产品中有毒有害物质或元素的名称及含量

Indication for each major part if substance exceeds limit

Value	Meaning
O	Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006. 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要 求以下
X	Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006. • Data listed in the table represents best information available at the time of publication 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的 限量要求 • 此表所列数据为发布时所能获得的最佳信息

List of hazardous substances

Component name 部件名称	Hazardous substance 有毒有害物质或元素					
	Pb 铅	Hg 汞	Cd 镉	Cr6+ 六价铬	PBB 多溴联苯	PBDE 多溴二苯醚
ÄKTA start, 29-0220-94 [1]	X	0	0	0	0	0
Frac30, 29-0230-51 [1]	X	0	0	0	0	0
UNICORN start, 29-0187-51 [1]	0	0	0	0	0	0

1 The product has not been tested as per the Chinese standard *SJ/T11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Product*.

4 EC Declaration of Conformity

GE Healthcare

EC Declaration of Conformity

We: GE Healthcare Bio-Sciences AB

Declare under our sole responsibility that the product:

Type of equipment:	**Chromatographic System**
Brand name:	**ÄKTA™ start and Frac30**
Code/Article no:	**29022094, 29023051**

Is in conformity with the provision of the;

2006/42/EC	Machinery Directive (MD)

And in conformity with the provision of the following EC Directives;

2004/108/EC	Electromagnetic Compatibility Directive (EMC)

And that the standards referenced have been applied:

EN 12100:2010	Safety of machinery. General principles for design. Risk assessment and risk reduction.
EN 61010-1:2010	Safety requirements for electrical equipment for measurement, control, and laboratory use.
EN 61326-1:2006	Electrical equipment for measurement, control and laboratory use. EMC requirements.

This product was CE marked in 2013

Uppsala, 10 Sep 2013

Ewa Bylund
Director Regulatory Affairs

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